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PREVALENCE OF DIAGNOSED AND UNDIAGNOSED HYPERTENSION IN A RURAL COMMUNITY: A HOME BASED SCREENING STUDY

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ABSTRACT: Background: Hypertension is one of the global risks for mortality and is seen with drastic rise in developing nations with rise in age. **Methods:** This cross sectional study was conducted in Ottapalam town, Palakkad district, Kerala, India. Based on inclusion criteria (non-pregnant, age group between 35-75 years) 142 subjects were studied. Patient data (demographics, lifestyle factors, medical reports) was collected with the help of a suitable questionnaire. **Results:** The results during the study period of four months on 142 subjects for hypertension and pre-hypertension revealed that, more than half (69%) of the study group were found to be hypertensives. Of the 98 reported cases, 42(29.57% of 142) were “known” cases of hypertension and 22 (15.49% of 142) were newly diagnosed cases. This included cases which were had ISH, IDH and cases having both diabetes and hypertension. A positive association was observed between hypertension and age, BMI, alcohol and, tobacco uses other than smoking. 25 patients were found to be pre-hypertensive, among which 56% (14 cases) were males and 44% (11 cases) females. In addition to the above findings, a positive association was also observed between pre-hypertension and age, BMI, family history of diabetes and, hypertension. **Conclusion:** This study demonstrated the fact that the burden of hypertension is insidiously increasing in India and is becoming common among communities. Patient awareness and timely diagnosis and appropriate intervention may limit the progression of such diseases.

INTRODUCTION: Hypertension is one of the predominant global risks for mortality and is seen with a drastic rise in developing nations in accordance with rise in age.¹ One in three adults worldwide has high blood pressure. Hypertension increases the risk of heart attack, stroke, kidney failure and many other associated co morbidities.

Treating raised blood pressure and maintaining it below 140/90 mmHg is associated with a reduction in cardiovascular complications.² The high prevalence of hypertension in the urban and rural population in India presents a formidable challenge to the Indian health system.³ Recent studies show that for every known person with hypertension there are two persons with either undiagnosed hypertension or prehypertension.⁴

High BP is ranked as the third most important risk factor for attributable burden of disease in south Asia (2010).⁵ HT is directly responsible for 57% of all stroke deaths and 24% of all CHD deaths in

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India. This fact is important because HT is a controllable disease and a 2mmHg population-wide decrease in BP can prevent 151,000 stroke and 153,000 CHD deaths in India.^{1, 5} Even pollution also promote to inflammation, oxidative stress and endothelial dysfunction which may raise the risk of cardiovascular events, hypertension and diabetes mellitus.⁶ These results denote significance of lifestyle changes, illiteracy, genetics, pollution etc., in spreading of this epidemic.

The selected area for finding the prevalence of hypertension is an industrial area and most of the people are illiterates and working class people. So the result of this study can easily evaluate the major risk factors that can lead to hypertension. The motive of this study was to find out the prevalence of hypertension and to create awareness about hypertension among the community and thereby to increase the standard of living.

Methodology:

Study site and Study design:

This study was a community based cross sectional study carried out in Ottapalam town, Palakkad district, Kerala, India. The study population was selected according to the inclusion criteria. Inclusion criteria include population between 35 and 75 years, not pregnant. Subjects for screening were selected according to the questionnaire, willing to undergo screening tests and providing a signed consent.

All the study work was conducted in accordance with the guidelines for Good Epidemiological Practices and after getting approval from institutional ethical committee.

Assessment:

Subjects' data were collected in two steps. During the first home based survey, questionnaire was used to gather information on subjects' demographics, medical history, family history, lifestyle parameters etc., Then, based on the factors in the questionnaire and inclusion criteria subjects were selected for screening.

Blood pressure (BP) was measured using an automated sphygmomanometer using oscillometric method. Two readings were taken in a resting

patient at a 5-min interval, and the average of the two readings was recorded. In case of a difference of > 5mmHg in the readings, two more readings were taken in a similar manner, and the average of all readings was recorded.

Hypertension, in 'known' as well as 'new' cases, was classified as per the recommendations of the 8th Report of the Joint National Committee on Prevention, Detection, Evaluation and Treatment of High Blood Pressure. Patients without previously reported hypertension had a systolic BP \geq 140mmHg or a diastolic BP \geq 90mmHg were considered as 'new' cases. Consequently, patients without a previous history of hypertension with systolic BP < 140mmHg and diastolic BP < 90mmHg were considered as having non hypertension. Patients who had systolic BP 120-139mmHg or a diastolic BP 80-89mmHg were classified as having "pre-hypertension". Isolated systolic hypertension (ISH) was defined as systolic BP \geq 140mmHg and diastolic BP \leq 89mmHg, whereas isolated diastolic hypertension (IDH) was defined as diastolic BP \geq 90mmHg and systolic BP \leq 139mmHg.

RESULTS: Based on the work methodology, 142 subjects were totally analysed for this study. The study population was found to consist more males (50.70%) than females (49.06%), and 69.24% (n=98) were found to be hypertensive and 30.28% (n= 43) as non-hypertensive.

Prevalence of hypertension:

More than half (69.24%) of the study group were found to be hypertensive (**Table 1**). Out of the 98 reported cases, 76 (53.6% of 142) were "known" cases of hypertension and 22 (15.8% of 142) were newly diagnosed cases. This included cases which were having ISH, IDH and cases having both diabetes and hypertension. 17.6% (25 of 142) were listed as pre hypertensive. Prevalence of ISH was 4.9% (7 of 142) and IDH was 2.8% (4 of 142).

A comparison between those with and without hypertension is presented in (**Table 2**). Most of the hypertensive cases were males (42.25%; n=60) than females (27.3%; n=39). In our study, hypertension reporting in an age group between 56-65 years was higher.

TABLE 1: REPRESENTS OVERALL PREVALENCE OF HYPERTENSION

Category	Total No. of subjects	No .of male	No. of female
Overall hypertensive subjects	98 (69.24%)	60(61.22%)	38(38.8%)
Known hypertensives	42 (29.57%)	24(57.14%)	18 (42.85%)
Pre-hypertensives	25 (17.60%)	14 (56%)	11(44%)
Newly diagnosed hypertensives	22(15.49%)	11(50%)	11 (50%)
Isolated systolic hypertensives	7(4.9%)	4(57.14%)	3 (42.85%)
Isolated diastolic hypertensives	4(2.8%)	2 (50%)	2(50%)
Non-hypertensives	43(30.28%)	15 (34.9%)	28(65.1%)

TABLE 2: COMPARISONS BETWEEN SUBJECTS WITH AND WITHOUT HYPERTENSIONS

Variables	With hypertension (n=98)	Without hypertension (n=43)
	Sex [n (%)]	
Male	60 (61.22%)	16 (37.20%)
Female	39 (39.79%)	28 (65.11%)
	Age categories [n (%)]	
35-45 years	14 (14.28%)	16 (37.20%)
46-55 years	25 (25.51%)	10 (23.25%)
56-65 years	35 (35.71%)	9 (20.93%)
66-75 years	25 (25.51%)	8 (18.10%)
	Co-existence of diabetes [n (%)]	
Yes	23 (23.46%)	11 (25.58%)
	Family history [n (%)]	
Diabetes	20 (20.40%)	7 (16.27%)
Hypertension	20 (20.40%)	6 (13.95%)
	BMI [n (%)]	
<18.5/sq.m	13 (13.26%)	12 (27.90%)
18.5 - 22.9	17 (17.34%)	9 (20.93%)
23- 24.9	22 (22.44%)	9 (20.93%)
25-29.9	26 (26.53%)	7(16.27%)
30+	21 (21.42%)	6 (13.95%)
	Lifestyle factors [n (%)]	
Smoking (past and present)	53 (54.08%)	29 (67.44%)
Alcohol consumption (past & present)	50 (51.02%)	31 (72.09%)
Other tobacco uses	42 (42.85%)	30 (69.76%)

Out of the 98 reported cases, 23 (23.46%) cases consisted of both hypertension and diabetes. Changes in BMI were also studied and it shows positive relationship with hypertension and without hypertension. Number of hypertensives were more between the BMI values of 25-29.9 (26.53%; 26 cases) and it was found to be increasing with increase in BMI values. Alcohol consumption was positively associated with hypertension status and tobacco uses other than smoking were also positively associated with hypertension.

DISCUSSION: This study was conducted to find out the prevalence of hypertension in a selected community and to find out the significance of various risk factors that are associated with the disease. Carrying out such studies would also be helpful in finding the significance of early diagnosis of the disease state.

Recent studies conducted over a few years had showed a rapid rise in hypertension in India. This could be due to sedentarism, urbanization and food habits. Generally Indians have a high intake of salt. Some ethnic foods such as chutneys, pickles and papads are regular and these can predispose to increase in sodium consumption and hypertension.⁷

More than half of this study population were found to be hypertensives. These findings showed a positive deviation with findings of a previous study which showed 51% prevalence of hypertension. The prevalence of ISH was found to be 5.2% and, IDH was 2.8%. ISH is a potent risk factor for cardiovascular disease and stroke which was observed to be more in elderly patents and IDH were seen in patients younger than 50 years of age. In this study, population consisting of higher number of elderly patients may be a reason for

increased prevalence of ISH, even though further studies are needed for better understanding of the prevailing scenario and causes leading to such illnesses.

The study revealed that hypertension in an age group between 56-65 years was found to be higher. Increase in HTN with advancing age was shown by other studies.^{8,9} This may be due to the fact that age probably represents accumulation of environmental influences and the effect of genetically programmed senescence in the body systems.¹⁰ It was further observed that the pre-hypertensive condition was decreasing and hypertensive cases were increasing with progression of age / age group. This may be due to the lack of awareness on physical activity, fitness and sedentarism.¹¹

BMI were found to be significantly associated with hypertension. Similar findings were reported by other authors.^{8, 9, 12, 13, 15} Mahmood *et al* (2012)¹⁴ reported that fitness and BMI were independently associated to BP.

Upper social classes were found to be significantly associated with hypertension in this study population. Stress may cause hypertension through repeated blood pressure elevations as well as by stimulation of the nervous system to release large amounts of vasoconstricting hormones that increase blood pressure. Factors affecting blood pressure through stress include white coat hypertension, job strain, race, social environment, and emotional distress.¹¹ Hypertensive and pre-hypertensive cases were also observed to be increasing amongst house wives. This may be due to the hormonal factors, sedentarism and stress.^{11, 16}

This study had found a positive association between alcohol intake and hypertension. People with a habit of alcohol consumption (past and present) showed a significant association with hypertension.^{9, 11} This may be due to the stimulation of the sympathetic nervous system, endothelin, rennin-angiotensin-aldosterone axis (RAS), inhibition of vascular relaxing substances like nitric oxide, calcium or magnesium depletion and increased acetaldehyde.¹⁵ But smoking was found not to show any significant association with

hypertension in this community and using tobacco other than smoking showed significant relationship.

The effect of diet was not effectively found in this community because almost all the people were non-vegetarians. Illiteracy of the community may be a factor for increase in lack of awareness in the population. Illiteracy and limited awareness of the need for testing cost of travel or other factors may be responsible for the higher prevalence of hypertension. Kath *et al*(2014)¹⁷ reported that poor detection rate was seen in Indian population due to low awareness.

Family history has been known to be a predisposing factor in people with hypertension. Family history of hypertension in this community was 20% of the total hypertensive patients and it does not show any significance in our study. But in case of pre hypertensive patients family history of both diabetes and hypertension shows significance.

This study had limitations too. One of the main limitations of this study was the inclusion of small population from a rural area and these results could be varying in urban areas. Relation of BMI with diabetes and hypertension were studied here. But calculating the waist- line circumference is more advised than BMI. As our study population consisted of more non- vegetarians, there may be lack conclusive results on the information regarding prevalence and association between hypertension, diabetes and diet. Despite these limitations, this study may be helpful in finding the various problems of the community and its relation to hypertension and pre-hypertension.

CONCLUSION: This study helps in early detection of hypertension which could be facilitated by periodic screening of the people regularly. Counselling of the community may help in lifestyle modification and its role in controlling hypertension along with its complications, which should also be emphasized. Pharmacists are in the ideal position to reach such populations and contribute to screening procedures. Pharmacist-led educational interventions, awareness and deliberations can provide simple, significant contributions in imparting knowledge on hypertension along with its risk factors and

complication by providing free screening benefits to the people living in such communities.

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CONFLICT OF INTEREST: The author(s) warrant that the manuscript submitted is our own original work. All authors participated in the work and have taken public responsibility for the work. All authors have approved the manuscript with no conflict of interest. The manuscript has not been communicated elsewhere for publication. All material included in the manuscript does not infringe upon any existing copyright or other than copyright. The manuscript does not violate any intellectual property right of any person or entity.

REFERENCES:

1. World Health Organization: Global health risks: mortality and burden of diseases attributable to selected major risks. http://www.who.int/healthinfo/global_burden_diseases/GlobalHealthRisks_report_full.pdf. Published December 2010. Accessed June 2014.
2. World Health Organization: Global Health Repository. Available from: http://www.who.int/gho/ncd/risk_factors/blood_pressure_prevalence_text/en/index.html. Published May 2013. Accessed April 2014.
3. Mohan S, Campbell N and Chockalingam A: Time to effectively address hypertension in India. *Indian J Med Res.* 2013; 137:627-631.
4. Joshi SR, Saboo B and Vadivale M et al: Prevalence of Diagnosed and Undiagnosed Diabetes and Hypertension in India-Results from the Screening India's Twin Epidemic (SITE) Study. *Diabetes Technol Ther.* Jan 2012; 14:8-15.
5. Lim SS, Vos T, Flaxman AD, Danaei G, Shibuya K and Adair RH et al: A comparative risk assessment of burden of disease and injury attributable to 67 risk factors and risk factor clusters in 21 regions, 1990-2010: a systematic analysis for the Global Burden of Disease Study 2010. *Lancet.* 2012; 380:2224-2260.
6. Brook RD, Rajagopalan S, Pope CA and Brook JR: Particulate matter air pollution and cardio vascular diseases: An update to the scientific statement from the American Heart Association. *Circulation.* 2010; 121:2331-2378.
7. Joshi SR, Saboo B, Vadivale M, Dani SI, Mithal A and Kaul U et al: Prevalence of diagnosed and undiagnosed diabetes and hypertension in India-Results from the screening India's twin epidemic (SITE) study. *Diabetes Technol Ther.* 2012; 14:8-15.
8. Borah PK, Shankarishan P, Hazarika NC and Mahanta J: Hypertension subtypes and angiotensin converting enzyme (ACE) gene polymorphism in Indian population. *J Assoc Physicians India.* 2012; 60:15-17.
9. Dutta A and Ray MR: Prevalence of hypertension and prehypertension in rural women: a report from the villages of West Bengal, a state in the eastern part of India. *Aust J Rural Health.* 2012; 20:219-225.
10. Vashitha A, Agarwal BK and Gupta: Hospital based study: prevalence and predictors of type 2 diabetes mellitus in rural population of Haryana. *Asian Pac J Trop Dis.* 2012; 173:1-9.
11. Meshram II, Arlappa N, Balkrishna N, Rao KM, Laxmaiah A and Brahman G: Prevalence of hypertension, its correlates and awareness among adult tribal population of Kerala state, India. *J Postgrad Med.* 2012; 58:255-261.
12. Gupta R, Deedwania PC, Achari V, Bhansali A, Gupta BK and Gupta A et al: Normotension, prehypertension, and hypertension in urban middle-class subjects in India: prevalence, awareness, treatment, and control. *Am J Hypertens.* 2013; 26:83-94.
13. Shah A and Mohammad A: Prevalence of diabetes and hypertension and association with various risk factors among different Muslim populations of Manipur, India. *J Diabetes Metab Disord.* 2013; 12:1-10.
14. Mahmood SE and Ansari SH: Prevalence of Prehypertension and Hypertension in rural Bareilly. *Natl J Med Res.* 2012; 2:291-294.
15. Bansal SK, Saxena V, Kandpal SD, Gray WK, Walker RW and Goel D: The prevalence of hypertension and hypertension risk factors in a rural Indian community: A prospective door-to-door study. *J Cardiovasc Dis Res.* 2012; 3:117-23.
16. Midha T, Idris MZ, Saran RK, Srivastav AK and Singh SK: Prevalence and determinants of hypertension in the urban and rural population of a north Indian district. *East Afr J Public Health.* 2009; 6:268-273.
17. Kath AM, Sutapa A, George DS and Shah E: Socio-demographic inequalities in the prevalence, diagnosis and management of hypertension in India: analysis of nationally-representative survey data. *PLoS ONE.* 2014; 9:1-14

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